

I claim:

1. An apparatus for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said apparatus comprising:

5 a character-generating server, said character-generating server existing either as a single task in an embedded environment, a single process daemon in a UNIX environment, a physical circuit or a microchip, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, said temporal reference storage storing the most current time information, and a key-pool group connecting to said character generator, said key-pool group including any or all of a first kind of key with a first kind of pool, a second kind of key with a second kind of pool, and a third kind of key with a third kind of pool, said character generator capable of generating a character set, said character set having thirty-two different characters, based on a geometric progression of  $x(n) = p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around an origin, said orbit being defined as a unique and continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character set, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits cross an arbitrary infinite vector from said origin, said  $p$  representing a period, said period being the temporal difference between character sets along any of said orbit, said geometric

progression defining thirty-two periods on any of said orbit, said character set being a first kind of character set, a second kind of character set or a third kind of character set;

a network interface, said network interface connecting to said character generator and capable of providing said character generating-server with access to functions to

5 encode and send out information, and to receive and decode information; and

an external timer device, said external timer device connecting to said character-generating server and capable of providing both a current time and a periodic tick of approximately one second to said character-generating server.

10 2. The apparatus in claim 1, wherein said random generator makes a pseudo random number required by said character generator to select a position on said orbit.

15 3. The apparatus in claim 1, wherein said first kind of pool is a list of first kind of mapping positions in said first kind of key, said first kind of mapping position is marked “used” each time said character-generating server makes a character from said first kind of key.

20 4. The apparatus in claim 1, wherein said second kind of pool is a list of second kind of mapping positions in said second kind of key, said second kind of mapping position is marked “used” each time said character-generating server makes a character from said second kind of key.

5. The apparatus in claim 1, wherein said third kind of pool comprises a double primary pool and a double rotating pool, said third kind of key comprises a primary key and a rotating key, said double primary pool is a list of primary mapping positions in said primary key, said double rotating pool is a list of rotating mapping positions in said rotating key, said primary mapping position is marked “used” each time said character-generating server makes a character from said primary key, and said rotating mapping position is marked “used” each time said character-generating server makes a character from said rotating key.

6. The apparatus in claim 1, wherein said character-generating server clears said pool each time said pool is full, or every one second, whichever comes first.

7. The apparatus in claim 1, wherein said character-generating server is capable of generating 1,065,151,889,408 said first kind of character sets before it repeats a value if all said first kind of character sets are requested in a constant stream, actual number of said first kind of character set generated before repeating depends on said character-generating server restarts and idle time.

8. The apparatus in claim 1, wherein said character-generating server is capable of generating 1,065,151,899,408 said first kind of character sets every one second.

9. The apparatus in claim 1, wherein said character-generating server is capable of generating thirty-two said second kind of character sets every one second.

10. The apparatus in claim 1, wherein said character-generating server is capable of generating 1024 said third kind of character sets every one second.

11. The apparatus in claim 1, wherein said first kind of character set is easier to guess than either said second kind of character set or said third kind of character set.

12. The apparatus in claim 1, wherein said second kind of character set is guaranteed to not repeat for twenty-eight years from the activation of the character-generating server.

13. The apparatus in claim 1, wherein said third kind of character set is an extension of a second kind of character set in the sense that it will not repeat for twenty-eight years, said third kind of character set is simpler to guess than said second kind of character set.

14. The apparatus in claim 1, wherein said character-generating server listens on a fixed port for requests from a client, said client can be a single client or a group of clients, and never produces any uninitiated transmissions to said client.

15. An apparatus for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said apparatus comprising:

a character-generating server, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, said temporal

reference storage storing the most current time information, and a key-pool group  
connecting to said character generator, said key-pool group including any or all of a first  
kind of key with a first kind of pool, a second kind of key with a second kind of pool, and  
a third kind of key with a third kind of pool, said character generator capable of  
5 generating a character set, said character set having a pre-set number of different  
characters, based on a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric  
progression manifesting itself as a chaotic progression of orbits around an origin, said  
orbit being defined as a unique and continuous path around said origin and never crossing  
in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character  
10 set, said  $n$  representing the number of said character set generated by said character-  
generating server, said  $i$  representing a temporal difference between the time when two  
sequential orbits crossing an arbitrary infinite vector from said origin, said  $p$  representing  
a period, said period being the temporal difference between character sets along any of  
said orbit, said geometric progression defining said pre-set number of periods on any of  
15 said orbit, said character set being a first kind of character set, a second kind of character  
set and a third kind of character set;

a network interface, said network interface connecting to said character generator  
and capable of providing said character generating-server with access to functions to  
encode and send out information, and to receive or decode information; and

20 an external timer device, said external timer device connecting to said character-  
generating server and capable of providing both a current time and a periodic tick to said  
character-generating server, time interval between any of two consecutive said periodic  
ticks being adjustable.

16. The apparatus in claim 15, wherein said random generator makes a pseudo random number required by said character generator to select a position on said orbit.

5 17. The apparatus in claim 15, wherein said first kind of pool is a list of first kind of mapping positions in said first kind of key, said first kind of mapping position is marked “used” each time said character-generating server makes a character from said first kind of key.

10 18. The apparatus in claim 15, wherein said second kind of pool is a list of second kind of mapping positions in said second kind of key, said second kind of mapping position is marked “used” each time said character-generating server makes a character from said second kind of key.

15 19. The apparatus in claim 15, wherein said third kind of pool comprises a double primary pool and a double rotating pool, said third kind of key comprises a primary key and a rotating key, said double primary pool is a list of primary mapping positions in said primary key, said double rotating pool is a list of rotating mapping positions in said rotating key, said primary mapping position is marked “used” each time said character-  
20 generating server makes a character from said primary key, and said rotating mapping position is marked “used” each time said character-generating server makes a character from said rotating key.

20. The apparatus in claim 15, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

21. The apparatus in claim 15, wherein said character-generating server is capable of generating a significant large number of said first kind of character sets before it repeats a value if all said first kind of character sets are requested in a constant stream, actual number of said first kind of character set generated before repeating depends on said character-generating server restarts and idle time.

22. The apparatus in claim 15, wherein said character-generating server is capable of generating a significant large number of said first kind of character sets every tick.

23. The apparatus in claim 15, wherein said character-generating server is capable of generating said pre-set number of said second kind of character sets every tick.

24. The apparatus in claim 15, wherein said character-generating server is capable of generating a large number of said third kind of character sets every tick.

25. The apparatus in claim 15, wherein said first kind of character set is easier to guess than either said second kind of character set or said third kind of character set.

26. The apparatus in claim 15, wherein said second kind of character set is guaranteed to not repeat for a certain period of time from the activation of the character-generating server.

27. The apparatus in claim 15, wherein said third kind of character set is an extension of a second kind of character set in the sense that it will not repeat for a certain period of time, said third kind of character set is simpler to guess than said second kind of character set.

28. The apparatus in claim 15, wherein said character-generating server listens on a fixed port for requests from a client, said client can be a single client or a group of clients, and never produces any uninitiated transmissions to said client.

29. An apparatus for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said apparatus comprising:

a character-generating server, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, said temporal reference storage storing the most current time information, and a key-pool group, said key-pool group having a key and a pool, connecting to said character generator, said character generator capable of generating a character set, said character set having a pre-set number of different characters, based on a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around



an origin, said orbit being defined as a unique and continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character set, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the  
5 time when two sequential orbits crossing an arbitrary infinite vector from said origin, said  $p$  representing a period, said period is the temporal difference between character sets along any of said orbit, said geometric progression defining said pre-set number of periods on any of said orbit;

10 a network interface, said network interface connecting to said character generator and capable of providing said character generating-server with access to functions to encode and send out information, and to receive and decode information; and

15 an external timer device, said external timer device connecting to said character-generating server and capable of providing both a current time and a periodic tick to said character-generating server, time interval between any of two consecutive said periodic ticks being adjustable.

30. The apparatus in claim 29, wherein said character-generating server is capable of generating several different kind of character set.

20 31. The apparatus in claim 29, wherein said character-generating server has a plurality of key-pool groups.

32. The apparatus in claim 29, wherein said key-pool group has a key and a plurality of pools.

33. The apparatus in claim 29, wherein said random generator makes a pseudo  
5 random number required by said character generator to select a position on said orbit.

34. The apparatus in claim 29, wherein said pool is a list of mapping positions in said key, said mapping position is marked "used" each time said character-generating server makes a character from said key.

35. The apparatus in claim 29, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

36. The apparatus in claim 29, wherein said character-generating server is capable of  
15 generating at least said pre-set number of character sets every tick.

37. The apparatus in claim 29, wherein said character-generating server listens on a fixed port for requests from a client, said client can be a single client or a group of clients, and never produces any uninitiated transmissions to said client.

20 38. An apparatus for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said apparatus comprising:

a character-generating server, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, and a key-pool group, said key-pool group having a key and a pool, connecting to said character generator, said character-generating server being capable of generating a character set, said character set having a pre-set number of different characters;

a network interface, said network interface connecting to said character generator;  
and

an external timer device, said external timer device connecting to said character-generating server.

39. The apparatus in claim 38, wherein said character-generating server is capable of generating several different kinds of character sets.

40. The apparatus in claim 38, wherein said character-generating server has a plurality of key-pool groups.

41. The apparatus in claim 38, wherein said key-pool group having a key and a plurality of pools.

42. The apparatus in claim 38, wherein said external timer device is capable of providing both a current time and a periodic tick to said character-generating server.

43. The apparatus in claim 38, wherein said network interface is capable of providing said character generating-server access to functions to encode and send out information, and to receive and decode information.

5 44. The apparatus in claim 38, wherein said temporal reference storage stores the most current time information.

45. The apparatus in claim 38, wherein said character set is defined by a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a  
10 chaotic progression of orbits around an origin, said orbit being defined as a unique, continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character sets, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits crossing an arbitrary  
15 infinite vector from said origin, said  $p$  representing a period, said period being the temporal difference between character sets along an orbit, said geometric progression defining said pre-set number of periods per orbit.

46. The apparatus in claim 38, wherein said random generator makes a pseudo  
20 random number required by said character generator to select a position on said orbit.

47. The apparatus in claim 38, wherein said character-generating server has a plurality of key-pool groups.

48. The apparatus in claim 38, wherein said key-pool group has a key and a plurality of pools.

49. The apparatus in claim 38, wherein said pool is a list of mapping positions in said key, said mapping position is marked “used” each time said character-generating server makes a character from said key.

50. The apparatus in claim 38, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

51. The apparatus in claim 38, wherein said character-generating server is capable of generating at least said pre-set number of said character sets every tick.

52. The apparatus in claim 38, wherein said character-generating server listens on a fixed port for requests from a client, said client can be a single client or a group of clients, and never produces any uninitiated transmissions to said client.

53. An apparatus for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said apparatus comprising:

a character-generating server, said character-generating server existing either as a single task in an embedded environment, a single process daemon in a UNIX environment, a physical circuit or microchip, said character-generating server comprising

a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, said temporal reference storage storing the most current time information, and a key-pool group connecting to said character generator, said key-pool group including any or all of a first kind of key with a first kind of pool, a second kind of key with a second kind of pool, and a third kind of key with a third kind of pool, said character generator capable of generating a character set, said character set having thirty-two different characters, based on a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around an origin, said orbit being defined as a unique and continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character set, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits cross an arbitrary infinite vector from said origin, said  $p$  representing a period, said period being the temporal difference between character sets along any of said orbit, said geometric progression defining thirty-two periods on any of said orbit, said character set being a first kind of character set, a second kind of character set or a third kind of character set;

a network interface, said network interface connecting to said character generator and capable of providing said character generating-server with access to functions to

encode and send out information, and to receive and decode information;

an external timer device, said external timer device connecting to said character-generating server and capable of providing both a current time and a periodic tick of approximately one second to said character-generating server; and

a remote application, said remote application connecting to said character-generating server through said network interface, said remote application having a character-generating utility program, said character-generating utility program defining function prototypes for configuring said remote application connection to said character-generating server, and an application program interface, said application program interface allowing said remote application to query said character-generating server for said first kind of character set, said second kind of character set and said third kind of character.

54. The apparatus in claim 53, wherein said random generator makes a pseudo random number required by said character generator to select a position on said orbit.

55. The apparatus in claim 53, wherein said first kind of pool is a list of first kind of mapping positions in said first kind of key, said first kind of mapping position is marked "used" each time said character-generating server makes a character from said first kind of key.

56. The apparatus in claim 53, wherein said second kind of pool is a list of second kind of mapping positions in said second kind of key, said second kind of mapping position is marked "used" each time said character-generating server makes a character from said second kind of key.

57. The apparatus in claim 53, wherein said third kind of pool comprises a double primary pool and a double rotating pool, said third kind of key comprises a primary key and a rotating key, said double primary pool is a list of primary mapping positions in said primary key, said double rotating pool is a list of rotating mapping positions in said rotating key, said primary mapping position is marked "used" each time said character-generating server makes a character from said primary key, and said rotating mapping position is marked "used" each time said character-generating server makes a character from said rotating key.

58. The apparatus in claim 53, wherein said character-generating server clears said pool each time said pool is full, or every one second, whichever comes first.

59. The apparatus in claim 53, wherein both said character-generating server and said remote application are capable of generating 1,065,151,889,408 said first kind of character set before it repeats a value if all said groups of first kind of character sets are requested in a constant stream, actual number of said first kind of character set generated before repeating depends on said character-generating server restarts and idle time.

60. The apparatus in claim 53, wherein both said character-generating server and said remote application are capable of generating 1,065,151,899,408 said first kind of character sets every one second.



61. The apparatus in claim 53, wherein both said character-generating server and said remote application are capable of generating thirty-two said second kind of character sets every one second.

5 62. The apparatus in claim 53, wherein both said character-generating server and said remote application are capable of generating 1024 said third kind of character sets every one second.

63. The apparatus in claim 53, wherein said first kind of character set is easier to guess than either said second kind of character set or said third kind of character set.

64. The apparatus in claim 53, wherein said second kind of character set is guaranteed to not repeat for twenty-eight years from the activation of the character-generating server.

65. The apparatus in claim 53, wherein said third kind of character set is an extension of a second kind of character set in the sense that it will not repeat for twenty-eight years, said third kind of character set is simpler to guess than said second kind of character set.

66. The apparatus in claim 53, wherein said character-generating server listens on a fixed port for requests from said remote application, said remote application can be a single remote application or a group of remote applications, and never produces any uninitiated transmissions to said remote application.

67. An apparatus for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said apparatus comprising:

a character-generating server, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, said temporal reference storage storing the most current time information, and a key-pool group connecting to said character generator, said key-pool group including any or all of a first kind of key with a first kind of pool, a second kind of key with a second kind of pool, and a third kind of key with a third kind of pool, said character generator capable of generating a character set, said character set having a pre-set number of different characters, based on a geometric progression of  $x(n) = p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around an origin, said orbit being defined as a unique and continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character set, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits crossing an arbitrary infinite vector from said origin, said  $p$  representing a period, said period being the temporal difference between character sets along any of said orbit, said geometric progression defining said pre-set number of periods on any of said orbit, said character set being a first kind of character set, a second kind of character set and a third kind of character set;

a network interface, said network interface connecting to said character generator and capable of providing said character generating-server with access to functions to encode and send out information, and to receive and decode information;

an external timer device, said external timer device connecting to said character-  
5 generating server and capable of providing both a current time and a periodic tick to said character-generating server, time interval between any of two consecutive said periodic ticks being adjustable; and

a remote application, said remote application connecting to said character-  
generating server through said network interface, said remote application having a  
10 character-generating utility program, said character-generating utility program defining function prototypes for configuring said remote application connection to said character-generating server, and an application program interface, said application program  
15 interface allowing said remote application to query said character-generating server for said first kind of character set, said second kind of character set and said third kind of character.

68. The apparatus in claim 67, wherein said random generator makes a pseudo random number required by said character generator to select a position on said orbit.

20 69. The apparatus in claim 67, wherein said first kind of pool is a list of first kind of mapping positions in said first kind of key, said first kind of mapping position is marked “used” each time said character-generating server makes a character from said first kind of key.

70. The apparatus in claim 67, wherein said second kind of pool is a list of second kind of mapping positions in said second kind of key, said second kind of mapping position is marked “used” each time said character-generating server makes a character from said second kind of key.

71. The apparatus in claim 67, wherein said third kind of pool comprises a double primary pool and a double rotating pool, said third kind of key comprises a primary key and a rotating key, said double primary pool is a list of primary mapping positions in said primary key, said double rotating pool is a list of rotating mapping positions in said rotating key, said primary mapping position is marked “used” each time said character-generating server makes a character from said primary key, and said rotating mapping position is marked “used” each time said character-generating server makes a character from said rotating key.

72. The apparatus in claim 67, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

73. The apparatus in claim 67, wherein said character-generating server is capable of generating a significant large number of said first kind of character sets before it repeats a value if all said groups of first kind of character sets are requested in a constant stream, actual number of said first kind of character set generated before repeating depends on said character-generating server restarts and idle time.

74. The apparatus in claim 67, wherein both said character-generating server and said remote application are capable of generating a significant large number of said first kind of character sets every tick.

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75. The apparatus in claim 67, wherein both said character-generating server and said remote application are capable of generating said pre-set number of said second kind of character sets every tick.

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76. The apparatus in claim 67, wherein both said character-generating server and said remote application are capable of generating a large number of said third kind of character sets every tick.

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77. The apparatus in claim 67, wherein said first kind of character set is easier to guess than either said second kind of character set or said third kind of character set.

78. The apparatus in claim 67, wherein said second kind of character set is guaranteed to not repeat for a certain period of time from the activation of the character-generating server.

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79. The apparatus in claim 67, wherein said third kind of character set is an extension of a second kind of character set in the sense that it will not repeat for a certain period of

time, said third kind of character set is simpler to guess than said second kind of character set.

80. The apparatus in claim 67, wherein said character-generating server listens on a fixed port for requests from said remote application, said remote application can be a single remote application or a group of remote applications, and never produces any uninitiated transmissions to said client.

81. An apparatus for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said apparatus comprising:

a character-generating server, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, said temporal reference storage storing the most current time information, and a key-pool group, said key-pool group having a key and a pool, connecting to said character generator, said character generator capable of generating a character set, said character set having a pre-set number of different characters, based on a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around an origin, said orbit being defined as a unique and continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character set, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits crossing an arbitrary infinite vector from said origin, said

p representing a period, said period being the temporal difference between character sets along any of said orbit, said geometric progression defining said pre-set number of periods on any of said orbit;

a network interface, said network interface connecting to said character generator and capable of providing said character generating-server with access to functions to encode and send out information, and to receive and decode information;

an external timer device, said external timer device connecting to said character-generating server and capable of providing both a current time and a periodic tick to said character-generating server, time interval between any of two consecutive said periodic ticks being adjustable; and

a remote application, said remote application connecting to said character-generating server through said network interface, said remote application having a character-generating utility program, said character-generating utility program defining function prototypes for configuring said remote application connection to said character-generating server, and an application program interface, said application program interface allowing said remote application to query said character-generating server for said character set.

82. The apparatus in claim 81, wherein said character-generating server has a plurality of key-pool groups.

83. The apparatus in claim 81, wherein said key-pool group having a key and a plurality of pools.

84. The apparatus in claim 81, wherein said random generator makes a pseudo random number required by said character generator to select a position on said orbit.

5 85. The apparatus in claim 81, wherein said pool is a list of mapping positions in said key, said mapping position is marked “used” each time said character-generating server makes a character from said key.

10 86. The apparatus in claim 81, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

15 87. The apparatus in claim 81, wherein both said character-generating server and said remote application are capable of generating at least said pre-set number of groups of said character sets every tick.

88. The apparatus in claim 81, wherein said character-generating server listens on a fixed port for requests from said remote application, said client can be a single remote application or a group of remote applications, and never produces any uninitiated transmissions to said client.

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89. The apparatus in claim 81, wherein said character-generating server is capable of generating several different kind of character set.



90. An apparatus for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said apparatus comprising:

a character-generating server, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, and a key-pool group, said key-pool group having a key and a pool, connecting to said character generator, said character-generating server capable of generating a character sets, said character set having a pre-set number of different characters;

a network interface, said network interface connecting to said character generator;

an external timer device, said external timer device connecting to said character-generating server; and

a remote application, said remote application connecting to said character-generating server through said network interface, said remote application having a character-generating utility program, said character-generating utility program defining function prototypes for configuring said remote application connection to said character-generating server, and an application program interface, said application program interface allows said remote application to query said character-generating server for said character set.

91. The apparatus in claim 90, wherein said character-generating server has a plurality of key-pool groups.

92. The apparatus in claim 90, wherein said key-pool group having a key and a plurality of pools.

93. The apparatus in claim 90, wherein said remote application is capable of re-create  
5 a character set from a key.

94. The apparatus in claim 90, wherein said external timer device is capable of providing both a current time and a periodic tick to said character-generating server.

95. The apparatus in claim 90, wherein said network interface is capable of providing  
10 said character generating-server access to functions to encode and send out information, and to receive and decode information.

96. The apparatus in claim 90, wherein said temporal reference storage stores the  
15 most current time information.

97. The apparatus in claim 90, wherein said character set is defined by a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around an origin, said orbit being defined as a unique,  
20 continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character sets, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits crossing an arbitrary

infinite vector from said origin, said p representing a period, said period being the temporal difference between character sets along an orbit, said geometric progression defining said pre-set number of periods per orbit.

5 98. The apparatus in claim 90, wherein said random generator makes a pseudo random number required by said character generator to select a position on said orbit.

99. The apparatus in claim 90, wherein said pool is a list of mapping positions in said key, said mapping position is marked “used” each time said character-generating server  
10 makes a character from said key.

100. The apparatus in claim 90, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

101. The apparatus in claim 90, wherein both said character-generating server and  
15 remote application are capable of generating at least said pre-set number of groups of said character sets every tick.

102. The apparatus in claim 90, wherein said character-generating server listens on a  
20 fixed port for requests from said remote application, said remote application can be a single remote application or a group of remote applications, and never produces any uninitiated transmissions to said client.

103. The apparatus in claim 90, wherein said character-generating server is capable of generating several different kind of said character set.

104. A method for generating a group of character sets that are both never repeating

5 within certain period of time and difficult to guess, said method comprising:

(a) generating a request for said character set by a client of a character-generating server, said character-generating server existing either as a single task in an embedded environment or as a single process daemon in a UNIX environment, said character-

generating server comprising a character generator, a random generator connecting to  
10 said character generator, a temporal reference storage connecting to said character generator, said temporal reference storage storing the most current time information, and a key-pool group connecting to said character generator, said key-pool group including any or all of a first kind of key with a first kind of pool, a second kind of key with a second kind of pool, and a third kind of key with a third kind of pool;

15 (b) sending said request by said client to said character-generating server, said character-generating server having an external timer device capable of providing both a current time and a periodic tick of approximately one second to said character-generating server, said client connecting to said character-generating server through a network interface, said network interface connecting to said character generator and capable of  
20 providing said character generating-server with access to functions to encode and send out information, and to receive and decode information;

(c) generating a pseudo random number required by said character generator;

(d) sending said pseudo random number to said character generator;

(e) generating a character for said character set, said character set having thirty-two different characters, by said character generator based on a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around an origin, said orbit being defined as a unique and continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character set, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits crossing an arbitrary infinite vector from said origin, said  $p$  representing a period, said period being the temporal difference between character sets along any of said orbit, said geometric progression defining thirty-two periods on any of said orbit, said character set being a first kind of character set, a second kind of character set and a third kind of character set; and

(f) sending said character set by said character-generating server to said client.

105. The method in claim 104 further comprises repeating (c) to (e) until all said characters of said character set have been generated.

106. The method in claim 104, wherein said character generator selects a position on said orbit based on said random number generated by said random generator.

107. The method in claim 104, wherein said first kind of pool is a list of first kind of mapping positions in said first kind of key, said first kind of mapping position is marked

“used” each time said character-generating server makes a character from said first kind of key.

108. The method in claim 104, wherein said second kind of pool is a list of second  
5 kind of mapping positions in said second kind of key, said second kind of mapping position is marked “used” each time said character-generating server makes a character from said second kind of key.

109. The method in claim 104, wherein said third kind of pool comprises a double  
10 primary pool and a double rotating pool, said third kind of key comprises a primary key and a rotating key, said double primary pool is a list of primary mapping positions in said primary key, said double rotating pool is a list of rotating mapping positions in said rotating key, said primary mapping position is marked “used” each time said character-generating server makes a character from said primary key, and said rotating mapping  
15 position is marked “used” each time said character-generating server makes a character from said rotating key.

110. The method in claim 104, wherein said character-generating server clears said pool each time said pool is full, or every one second, whichever comes first.

20 111. The method in claim 104, wherein said character-generating server is capable of generating 1,065,151,889,408 said first kind of character set before it repeats a value if all said first kind of character sets are requested in a constant stream, actual number of said

first kind of character set generated before repeating depends on said character-  
generating server restarts and idle time.

112. The method in claim 104, wherein said character-generating server is capable of  
5 generating 1,065,151,899,408 said first kind of character sets every one second.

113. The method in claim 104, wherein said character-generating server is capable of  
generating thirty-two said second kind of character sets every one second.

114. The method in claim 104, wherein said character-generating server is capable of  
10 generating 1024 said third kind of character sets every one second.

115. The method in claim 104, wherein said first kind of character set is easier to guess  
than either said second kind of character set or said third kind of character set.

116. The method in claim 104, wherein said second kind of character set is guaranteed  
15 to not repeat for twenty-eight years from the activation of the character-generating server.

117. The method in claim 104, wherein said third kind of character set is an extension  
20 of a second kind of character set in the sense that it will not repeat for twenty-eight years,  
said third kind of character set is simpler to guess than said second kind of character set.

118. The method in claim 104, wherein said character-generating server listens on a fixed port for requests from said client, said client can be a single client or a group of clients, and never produces any uninitiated transmissions to said client.

119. A method for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said method comprising:

(a) generating a request for said character set by a client of a character-generating server, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, said temporal reference storage storing the most current time information, and a key-pool group connecting to said character generator, said key-pool group including any or all of a first kind of key with a first kind of pool, a second kind of key with a second kind of pool, and a third kind of key with a third kind of pool;

(b) sending said request by said client to said character-generating server, said character-generating server having an external timer device capable of providing both a current time and a periodic tick to said character-generating server, time interval between any of two consecutive said periodic ticks being adjustable, said client connecting to said character-generating server through a network interface, said network interface connecting to said character generator and capable of providing said character generating-server with access to functions to encode and send out information, and to receive and decode information;

(c) generating a pseudo random number required by said character generator;

(d) sending said pseudo random number to said character generator;



(e) generating a character for said character set, said character set having a pre-set number of characters, by said character generator based on a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around an origin, said orbit being defined as a unique and continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character set, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits crossing an arbitrary infinite vector from said origin, said  $p$  representing a period, said period being the temporal difference between character sets along any of said orbit, said geometric progression defining a pre-set number of periods on any of said orbit, said character set being a first kind of character set, a second kind of character set and a third kind of character set; and

(f) sending said character set by said character-generating server to said client.

120. The method in claim 119 further comprises repeating (c) to (e) until all said characters of said character set have been generated.

121. The method in claim 119, wherein said character generator selects a position on said orbit based on said random number generated by said random generator.

122. The method in claim 119, wherein said first kind of pool is a list of first kind of mapping positions in said first kind of key, said first kind of mapping position is marked

“used” each time said character-generating server makes a character from said first kind of key.

123. The method in claim 119, wherein said second kind of pool is a list of second  
5 kind of mapping positions in said second kind of key, said second kind of mapping position is marked “used” each time said character-generating server makes a character from said second kind of key.

124. The method in claim 119, wherein said third kind of pool comprises a double  
10 primary pool and a double rotating pool, said third kind of key comprises a primary key and a rotating key, said double primary pool is a list of primary mapping positions in said primary key, said double rotating pool is a list of rotating mapping positions in said rotating key, said primary mapping position is marked “used” each time said character-generating server makes a character from said primary key, and said rotating mapping  
15 position is marked “used” each time said character-generating server makes a character from said rotating key.

125. The method in claim 119, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

20 126. The method in claim 119, wherein said character-generating server is capable of generating a significant large number of said first kind of character sets before it repeats a value if all said first kind of character sets are requested in a constant stream, actual

number of said first kind of character set generated before repeating depends on said character-generating server restarts and idle time.

127. The method in claim 119, wherein said character-generating server is capable of  
5 generating a significant large number of said first kind of character sets every tick.

128. The method in claim 119, wherein said character-generating server is capable of generating said pre-set number of said second kind of character sets every tick.

129. The method in claim 119, wherein said character-generating server is capable of  
10 generating a large number of said third kind of character sets every tick.

130. The method in claim 119, wherein said first kind of character set is easier to guess  
than either said second kind of character set or said third kind of character set.

131. The method in claim 119, wherein said second kind of character set is guaranteed  
15 to not repeat for a certain period of time from the activation of the character-generating server.

20 132. The method in claim 119, wherein said third kind of character set is an extension of a second kind of character set in the sense that it will not repeat for a certain period of time, said third kind of character set is simpler to guess than said second kind of character set.

133. The method in claim 119, wherein said character-generating server listens on a fixed port for requests from said client, said client can be a single client or a group of clients, and never produces any uninitiated transmissions to said client.

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135. A method for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said method comprising:

(a) generating a request for said character set by a client of a character-generating server, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, said temporal reference storage storing the most current time information, and a key-pool group, said key-pool group having a key and a pool, connecting to said character generator;

(b) sending said request by said client to said character-generating server, said character-generating server having an external timer device capable of providing both a current time and a periodic tick to said character-generating server, time interval between any of two consecutive said periodic ticks being adjustable, said client connecting to said character-generating server through a network interface, said network interface connecting to said character generator and capable of providing said character generating-server with access to functions to encode and send out information, and to receive and decode information;

(c) generating a pseudo random number required by said character generator;

(d) sending said pseudo random number to said character generator;

(e) generating a character for said character set, said character set having a pre-set number of characters, by said character generator based on a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around an origin, said orbit being defined as a unique and continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character set, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits crossing an arbitrary infinite vector from said origin, said  $p$  representing a period, said period being the temporal difference between character sets along any of said orbit, said geometric progression defining said pre-set number of periods on any of said orbit; and

(f) sending said character set by said character-generating server to said client.

136. The method in claim 135 further comprises repeating (c) to (e) until all said characters of said character set have been generated.

137. The method in claim 135, wherein said character generator selects a position on said orbit based on said random number generated by said random generator.

138. The method in claim 135, wherein said pool is a list of mapping positions in said key, said mapping position is marked “used” each time said character-generating server makes a character from said key.

139. The method in claim 135, wherein said character-generating server is capable of generating several different kind of character set.

140. The method in claim 135, wherein said character-generating server has a plurality  
5 of key-pool groups.

141. The method in claim 135, wherein said key-pool group has a key and a plurality of pools.

10 142. The method in claim 135, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

143. The method in claim 135, wherein said character-generating server is capable of generating at least said pre-set number of said character sets every tick.

15 144. The method in claim 135, wherein said character-generating server listens on a fixed port for requests from said client, said client can be a single client or a group of unrelated clients, and never produces any uninitiated transmissions to said client.

20 145. A method for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said method comprising:

(a) generating a request for said character set by a client of a character-generating server, said character-generating server comprising a character generator, a random

generator connecting to said character generator, a temporal reference storage connecting to said character generator, and a key-pool group, said key-pool group having a key and a pool, connecting to said character generator, said character-generating server being capable of generating a character set, said character set having a pre-set number of  
5 different characters;

(b) sending said request by said client to said character-generating server, said character-generating server having an external timer device, said external timer device connecting to said character-generating server, said client connecting to said character-generating server through a network interface, said network interface connecting to said  
10 character generator;

(c) generating a pseudo random number required by said character generator;

(d) sending said pseudo random number to said character generator;

(e) generating a character for said character set by said character generator; and

(f) sending said character set by said character-generating server to said client.  
15

146. The method in claim 145 further comprises repeating (c) to (e) until all said characters of said character set have been generated.

147. The method in claim 145, wherein said external timer device is capable of

20 providing both a current time and a periodic tick to said character-generating server, time interval between any of two consecutive said periodic ticks being adjustable.

148. The method in claim 145, wherein said network interface is capable of providing said character generating-server access to functions to encode and send out information, and to receive and decode information.

5 149. The method in claim 145, wherein said temporal reference storage stores the most current time information.

10 150. The method in claim 145, wherein said character set is defined by a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around an origin, said orbit being defined as a unique, continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character sets, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits crossing an arbitrary infinite vector from said origin, said  $p$  representing a period, said period being the temporal difference between character sets along an orbit, said geometric progression defining said pre-set number of periods per orbit.

15 151. The method in claim 145, wherein said random generator makes a pseudo random number required by said character generator to select a position on said orbit.



152. The method in claim 145, wherein said pool is a list of mapping positions in said key, said mapping position is marked “used” each time said character-generating server makes a character from said key.

5 153. The method in claim 145, wherein said character-generating server has a plurality of key-pool groups

154. The method in claim 145, wherein said key-pool group has a key and a plurality of pools.

10 155. The method in claim 145, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

15 156. The method in claim 145, wherein said character-generating server is capable of generating several different kind of character set.

157. The method in claim 145, wherein said character-generating server listens on a fixed port for requests from said client, said client can be a single client or a group of unrelated clients, and never produces any uninitiated transmissions to said client.

20 158. A method for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said method comprising:

(a) generating a request for said character set by a client of a character-generating server, said character-generating server existing either as a single task in an embedded environment or as a single process daemon in a UNIX environment, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, said temporal reference storage storing the most current time information, and a key-pool group connecting to said character generator, said key-pool group including any or all of a first kind of key with a first kind of pool, a second kind of key with a second kind of pool, and a third kind of key with a third kind of pool;

(b) sending said request by said client to said character-generating server, said character-generating server having an external timer device capable of providing both a current time and a periodic tick of approximately one second to said character-generating server, said client connecting to said character-generating server through a network interface, said network interface connecting to said character generator and capable of providing said character generating-server with access to functions to encode and send out information, and to receive and decode information;

(c) generating a pseudo random number required by said character generator;

(d) sending said pseudo random number to said character generator;

(e) generating a character for said character set, said character set having thirty-two different characters, by said character generator based on a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around an origin, said orbit being defined as a unique and continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said

x(n-1) representing different character set, said n representing the number of said character set generated by said character-generating server, said i representing a temporal difference between the time when two sequential orbits crossing an arbitrary infinite vector from said origin, said p representing a period, said period being the temporal difference between character sets along any of said orbit, said geometric progression defining thirty-two periods on any of said orbit, said character set being a first kind of character set, a second kind of character set and a third kind of character set; and

- (f) sending said character set along with a related key by said character-generating server to said client;
- (g) sending said character set along with said related key to a target server, said target server connecting to said character-generating server through said network interface, said target server having a character-generating utility program, said character-generating utility program defines function prototypes for configuring said target server connection to said character-generating server, and an application program interface, said application program interface allows said target server to query said character-generating server for said first kind of character set, said second kind of character set or said third kind of character set;
- (h) sending said related key to said character-generating server by said target server;
- (i) re-creating said character set from said related key by said target server; and
- (j) sending said character set along with said related key to said target server.

159. The method in claim 158 further comprises repeating (c) to (e) until all said characters of said character set have been generated.

160. The method in claim 158, wherein said character generator selects a position on said orbit based on said random number generated by said random generator.

5 161. The method in claim 158, wherein said first kind of pool is a list of first kind of mapping positions in said first kind of key, said first kind of mapping position is marked “used” each time said character-generating server makes a character from said first kind of key.

10 162. The method in claim 158, wherein said second kind of pool is a list of second kind of mapping positions in said second kind of key, said second kind of mapping position is marked “used” each time said character-generating server makes a character from said second kind of key.

15 163. The method in claim 158, wherein said third kind of pool comprises a double primary pool and a double rotating pool, said third kind of key comprises a primary key and a rotating key, said double primary pool is a list of primary mapping positions in said primary key, said double rotating pool is a list of rotating mapping positions in said rotating key, said primary mapping position is marked “used” each time said character-  
20 generating server makes a character from said primary key, and said rotating mapping position is marked “used” each time said character-generating server makes a character from said rotating key.

164. The method in claim 158, wherein said character-generating server clears said pool each time said pool is full, or every one second, whichever comes first.

165. The method in claim 158, wherein both said character-generating server and said target server are capable of generating 1,065,151,889,408 said first kind of character set before it repeats a value if all said first kind of character sets are requested in a constant stream, actual number of said first kind of character set generated before repeating depends on said character-generating server restarts and idle time.

166. The method in claim 158, wherein both said character-generating server and said target server are capable of generating 1,065,151,899,408 said first kind of character sets every one second.

167. The method in claim 158, wherein both said character-generating server and said target server are capable of generating thirty-two said second kind of character sets every one second.

168. The method in claim 158, wherein both said character-generating server and said target server is capable of generating 1024 said third kind of character sets every one second.

169. The method in claim 158, wherein said first kind of character set is easier to guess than either said second kind of character set or said third kind of character set.

170. The method in claim 158, wherein said second kind of character set is guaranteed to not repeat for twenty-eight years from the activation of the character-generating server.

5 171. The method in claim 158, wherein said third kind of character set is an extension of a second kind of character set in the sense that it will not repeat for twenty-eight years, said third kind of character set is simpler to guess than said second kind of character set.

10 172. The method in claim 158, wherein said character-generating server listens on a fixed port for requests from said client, said client can be a single client or a group of clients, and never produces any uninitiated transmissions to said client.

173. A method for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said method comprising:

- 15 (a) generating a request for said character set by a client of a character-generating server, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, said temporal reference storage stores the most current time information, and a key-pool group connecting to said character generator, said key-pool
- 20 group includes any or all of a first kind of key with a first kind of pool, a second kind of key with a second kind of pool, and a third kind of key with a third kind of pool;
- (b) sending said request by said client to said character-generating server, said character-generating server having an external timer device capable of providing both a

current time and a periodic tick to said character-generating server, time interval between any of two consecutive said periodic ticks being adjustable, said client connecting to said character-generating server through a network interface, said network interface connecting to said character generator and capable of providing said character generating-server with access to functions to encode and send out information, and to receive and decode information;

(c) generating a pseudo random number required by said character generator;

(d) sending said pseudo random number to said character generator;

(e) generating a character for said character set, said character set having a pre-set number of characters, by said character generator based on a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifests itself as a chaotic progression of orbits around an origin, said orbit is defined as a unique and continuous path around said origin that never crosses in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  represent different character set, said  $n$  represents the number of said character set generated by said character-generating server, said  $i$  represents a temporal difference between the time when two sequential orbits cross an arbitrary infinite vector from said origin, said  $p$  represents a period, said period is the temporal difference between character sets along any of said orbit, said geometric progression defines a pre-set number of periods on any of said orbit, said character set can be a first kind of character set, a second kind of character set and a third kind of character set; an

(f) sending said character set along with a related key by said character-generating server to said client;

(g) sending said character set along with said related key to a target server, said target server connecting to said character-generating server through said network interface, said target server having a character-generating utility program, said character-generating utility program defining function prototypes for configuring said target server connection to said character-generating server, and an application program interface, said application program interface allowing said target server to query said character-generating server for said first kind of character set, said second kind of character set or said third kind of character set;

- (h) sending said related key to said character-generating server by said target server;
- (i) re-creating said character set from said related key by said target server; and
- (j) sending said character set along with said related key to said target server.

174. The method in claim 173 further comprises repeating (c) to (e) until all said characters of said character set have been generated.

175. The method in claim 173, wherein said character generator selects a position on said orbit based on said random number generated by said random generator.

176. The method in claim 173, wherein said first kind of pool is a list of first kind of mapping positions in said first kind of key, said first kind of mapping position is marked “used” each time said character-generating server makes a character from said first kind of key.



177. The method in claim 173, wherein said second kind of pool is a list of second kind of mapping positions in said second kind of key, said second kind of mapping position is marked “used” each time said character-generating server makes a character from said second kind of key.

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178. The method in claim 173, wherein said third kind of pool comprises a double primary pool and a double rotating pool, said third kind of key comprises a primary key and a rotating key, said double primary pool is a list of primary mapping positions in said primary key, said double rotating pool is a list of rotating mapping positions in said rotating key, said primary mapping position is marked “used” each time said character-generating server makes a character from said primary key, and said rotating mapping position is marked “used” each time said character-generating server makes a character from said rotating key.

179. The method in claim 173, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

180. The method in claim 173, wherein both said character-generating server and said target server are capable of generating a significant large number of said first kind of character sets before it repeats a value if all said first kind of character sets are requested in a constant stream, actual number of said first kind of character set generated before repeating depends on said character-generating server restarts and idle time.

181. The method in claim 173, wherein both said character-generating server and said target server are capable of generating a significant large number of said first kind of character sets every tick.

5 182. The method in claim 173, wherein both said character-generating server and said target server are capable of generating said pre-set number of said second kind of character sets every tick.

10 183. The method in claim 173, wherein both said character-generating server and said target server are capable of generating a large number of said third kind of character sets every tick.

15 184. The method in claim 173, wherein said first kind of character set is easier to guess than either said second kind of character set or said third kind of character set.

185. The method in claim 173, wherein said second kind of character set is guaranteed to not repeat for a certain period of time from the activation of the character-generating server.

20 186. The method in claim 173, wherein said third kind of character set is an extension of a second kind of character set in the sense that it will not repeat for a certain period of time, said third kind of character set is simpler to guess than said second kind of character set.

187. The method in claim 173, wherein said character-generating server listens on a fixed port for requests from said client, said client can be a single client or a group of unrelated clients, and never produces any uninitiated transmissions to said client.

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188. A method for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said method comprising:

(a) generating a request for said character set by a client of a character-generating server, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, said temporal reference storage storing the most current time information, and a key-pool group, said key-pool group having a key and a pool, connecting to said character generator;

(b) sending said request by said client to said character-generating server, said character-generating server having an external timer device capable of providing both a current time and a periodic tick to said character-generating server, time interval between any of two consecutive said periodic ticks being adjustable, said client connecting to said character-generating server through a network interface, said network interface connecting to said character generator and capable of providing said character generating-server with access to functions to encode and send out information, and to receive and decode information;

(c) generating a pseudo random number required by said character generator;

(d) sending said pseudo random number to said character generator;

(e) generating a character for said character set, said character set having a pre-set number of characters, by said character generator based on a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a chaotic progression of orbits around an origin, said orbit being defined as a unique and continuous path  
5 around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character set, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits crossing an arbitrary infinite vector from said origin, said  $p$  representing a period, said period being the temporal  
10 difference between character sets along any of said orbit, said geometric progression defining said pre-set number of periods on any of said orbit;

(f) sending said character set along with a related key by said character-generating server to said client;

(g) sending said character set along with said related key to a target server, said target  
15 server connecting to said character-generating server through said network interface, said target server having a character-generating utility program, said character-generating utility program defining function prototypes for configuring said target server connection to said character-generating server, and an application program interface, said application program interface allowing said target server to query said character-generating server for  
20 said character set;

(h) sending said related key to said character-generating server by said target server;

(i) re-creating said character set from said related key by said target server; and

(j) sending said character set along with said related key to said target server.

189. The method in claim 188 further comprises repeating (c) to (e) until all said characters of said character set have been generated.

5 190. The method in claim 188, wherein said character generator selects a position on said orbit based on said random number generated by said random generator.

191. The method in claim 188, wherein said pool is a list of mapping positions in said key, said mapping position is marked “used” each time said character-generating server makes a character from said key.  
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192. The method in claim 188, wherein both said character-generating server and said target server are capable of generating several different kind of character set.

193. The method in claim 188, wherein said character-generating server has a plurality of key-pool groups.  
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194. The method in claim 188, wherein said key-pool group has a key and a plurality of pools.

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195. The method in claim 188, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

196. The method in claim 188, wherein said character-generating server is capable of generating at least said pre-set number of said character sets every tick.

197. The method in claim 188, wherein said character-generating server listens on a fixed port for requests from said client, said client can be a single client or a group of unrelated clients, and never produces any uninitiated transmissions to said client.

198. A method for generating a group of character sets that are both never repeating within certain period of time and difficult to guess, said method comprising:

(a) generating a request for said character set by a client of a character-generating server, said character-generating server comprising a character generator, a random generator connecting to said character generator, a temporal reference storage connecting to said character generator, and a key-pool group, said key-pool group having a key and a pool, connecting to said character generator, said character-generating server capable of generating a character set, said character set having a pre-set number of different characters;

(b) sending said request by said client to said character-generating server, said character-generating server having an external timer device, said external timer device connecting to said character-generating server, said client connecting to said character-generating server through a network interface, said network interface connecting to said character generator;

(c) generating a pseudo random number required by said character generator;

(d) sending said pseudo random number to said character generator;

- (e) generating a character for said character set by said character generator;
- (f) sending said character set along with a related key by said character-generating server to said client;
- (g) sending said character set along with said related key to a target server, said target
- 5 server connecting to said character-generating server through said network interface, said target server having a character-generating utility program, said character-generating utility program defining function prototypes for configuring said target server connection to said character-generating server, and an application program interface, said application
- 10 program interface allowing said target server to query said character-generating server for said character set;
- (h) sending said related key to said character-generating server by said target server;
- (i) re-creating said character set from said related key by said target server; and
- (j) sending said character set along with said related key to said target server.

15 199. The method in claim 198 further comprises repeating (c) to (e) until all said characters of said character set have been generated.

200. The method in claim 198, wherein said external timer device is capable of providing both a current time and a periodic tick to said character-generating server, time

20 interval between any of two consecutive said periodic ticks being adjustable.

201. The method in claim 198, wherein said network interface is capable of providing said character generating-server access to functions to encode and send out information, and to receive and decode information.

5 202. The method in claim 198, wherein said temporal reference storage stores the most current time information.

203. The method in claim 198, wherein said character set is defined by a geometric progression of  $x(n)=p(x(n-1) + i)$ , said geometric progression manifesting itself as a  
10 chaotic progression of orbits around an origin, said orbit being defined as a unique, continuous path around said origin and never crossing in on itself or any other orbit, said  $x(n)$  and said  $x(n-1)$  representing different character sets, said  $n$  representing the number of said character set generated by said character-generating server, said  $i$  representing a temporal difference between the time when two sequential orbits crossing an arbitrary  
15 infinite vector from said origin, said  $p$  representing a period, said period being the temporal difference between character sets along an orbit, said geometric progression defining said pre-set number of periods per orbit.

204. The method in claim 198, wherein said random generator makes a pseudo random  
20 number required by said character generator to select a position on said orbit.



205. The method in claim 198, wherein said pool is a list of mapping positions in said key, said mapping position is marked “used” each time said character-generating server makes a character from said key.

5 206. The method in claim 198, wherein said character-generating server has a plurality of key-pool groups

207. The method in claim 198, wherein said key-pool group has a key and a plurality of pools.

10 208. The method in claim 198, wherein said character-generating server clears said pool each time said pool is full, or every said tick, whichever comes first.

15 209. The method in claim 198, wherein said character-generating server is capable of generating at least said pre-set number of groups of said character sets every tick.

210. The method in claim 198, wherein said character-generating server listens on a fixed port for requests from said client, said client can be a single client or a group of clients, and never produces any uninitiated transmissions to said client.

20 211. The apparatus in claim 198, wherein said character-generating server is capable of generating several different kind of character set.